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P-556 Younger maternal age as a factor associated with embryonic mosaicism. Analysis of 3222 blastocyst by Next Generation Sequencing

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Study question: Is there an association between healthy younger women under 30 years old and blastocyst mosaicism rate evaluated by NGS analysis?
Summary answer: Embryo mosaicism is independent to younger maternal age. However, morphological embryo quality is associated with embryo mosaicism.

What is known already: Embryo aneuploidy rate is strongly associated with maternal age, increasing in women older than 36y. On the contrary, the aneuploidy rate remains lower in women between 22 to 35y. However, the mosaicism rate in younger women seems to be slightly higher compared to older women. Although, there is still controversy on the relationship with maternal age and others factors.

Study design, size, duration: This retrospective study include 786 oocytes donation cycles were performed from 2016 to 2020. These IVF cycles generated 3222 blastocyst that were analyzed with PGT-A (NGS, Veryseq-Illumina). Mosaic embryos were call when variation was between 20-80%. Mosaic embryos were also sub-classify as a whole or segmental chromosome mosaicism. Mosaic embryos were according to the impact level as a: high mosaic level (>50%) and low mosaic level (≤50%). Data was classified by donor age: group-1 (18-22y) (n = 288) and group-2 (23-30y) (n = 498).

Participants/materials, setting, methods: All donors had a normal ovarian reserve and without any pathological or chromosome translocation. Donors had conventional oocyte stimulation with antagonist protocol trigger with agonist GnRH. Embryos were cultured with Lifeglobal media family under 7% CO2 and 5%O2.

A multilevel model was made and associations between variables by logistic regression were adjusted according to paternal age, morphological blastocyst quality, fertilization method, biopsy operator, day of embryo biopsy, number of chromosomes impacted per embryo and sperm quality.

Main results and the role of chance: Oocyte donation cycles generated 3222 blastocyst that were analyzed by NGS. The euploidy rate was 60.4% (n = 723) and 58.6% (n = 1186). Aneuploidy rate was 22.6% (n = 271) and 26.2% (n = 531) (p = 0.04). Mosaicism rate was 17% (n = 204) and 15.1% (n = 309) in group 1 and 2 respectively (p = 0.4)

Mosaic embryos were also further studied and classified according to the impact level. Interestingly, a vast majority of mosaic embryos have low mosaicism level (86.1%) compared to high mosaic level (13.9%) (p < 0.001).

The multilevel model shows that embryo quality correlated with embryo mosaicism where good quality embryos have a lower mosaicism rate compared to fair and poor quality blastocyst.

Finally, the chromosomes 21, 22 and 14 were the most frequent chromosome affect in whole chromosome mosaicism while the chromosomes 1, 2 and 5 were affected by segmental chromosome mosaicism and it was independent of maternal age.

Limitations, reasons for caution: The analysis was limited only for healthy women under 30 year old and it should not be extrapolate to patients with other pathologies.

Wider implications of the findings: The present study revealed that embryo mosaicism remains at similar percentage in younger healthy women. The mosaic embryos generated from young women have a lower chromosome impact, which according to other studies has a good implantation potential.

Trial registration number: N.A